

The seal of the State of South Dakota is a circular emblem with a serrated outer edge. The words "STATE OF SOUTH DAKOTA" are written in a semi-circle at the top, and "GREAT SEAL" is at the bottom. The year "1889" is at the very bottom. The center of the seal depicts a landscape with a river, a windmill, and a small town. A banner across the middle reads "UNDER GOD THE PEOPLE".

**Statement of Basis**

**Title V Air Quality Modification**

**Northern Lights Ethanol, LLC  
(POET Biorefining – Big Stone)  
Big Stone City, South Dakota**

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## 1.0 Background

On July 3, 2001, the South Dakota Department of Environment and Natural Resources (DENR) issued a Title V air quality operating permit to Northern Lights Ethanol, LLC (Northern Lights Ethanol) for an ethanol production facility near Big Stone City, South Dakota. The facility was permitted to produce 62 million gallons of undenatured ethanol per year and dried distiller grains and solubles (DDGS) as a saleable byproduct. After a modification in June 2002, which increased the production rate to 80 million gallons of undenatured ethanol per year, the Title V air quality operating permit was renewed on September 8, 2006.

The following revisions were made to the Title V air quality operating permit:

1. On April 10, 2007, DENR issued a minor permit amendment for the installation of two grain storage bins and associated equipment;
2. On October 30, 2007, DENR issued a minor permit amendment to revise the amount of paved roads and parking lots required to be paved;
3. On February 2, 2009, DENR issued a minor permit amendment to remove the sulfur dioxide testing requirements for the regenerative thermal oxidizer and correct the plant wide carbon monoxide limit; and
4. On March 19, 2009, DENR issued a modification to route the fluid bed cooler exhaust to the regenerative thermal oxidizer for air pollution control during normal operation and allow the regenerative thermal oxidizer to be bypassed for 100 hours per year. Several other changes were made during the modification.

On February 18, 2012, DENR issued Northern Lights Ethanol a renewed Title V Operating Permit.

### 1.1 Existing Equipment

Table 1-1 provides a list of permitted equipment from the existing Title V air quality operating permit issued February 18, 2012.

***Table 1-1 – Description of Permitted Units, Operations, and Processes***

<b>Unit</b>	<b>Description</b>	<b>Maximum Operating Rate</b>	<b>Control Device</b>
<b>#1</b>	Grain receiving, grain transfer via enclosed conveyor belt systems, and storage bin loading. Trucks and railcars transport grain to the ethanol plant and dump grain into receiving pits located in a partially enclosed building. Elevator legs transport the grain from the receiving pit to grain storage bins.	Transfer rate equals 840 tons of grain per hour  Permanent grain storage capacity is 2,810,000 bushels	Baghouse
	Dried distiller grain and solubles load out by truck or railcar.	220 tons of dried distiller grain and solubles per hour	
<b>#2</b>	Grain cleaning, grain transfer, and surge bin loading. The grain is transferred from the grain storage bins to a grain cleaner. The cleaned corn is transferred to a surge	140 tons of grain per hour	Baghouse

Unit	Description	Maximum Operating Rate	Control Device
	bin.		
#4	Fermentation system. Ethanol is produced from the fermentation process. The fermentation process consists of four fermentation tanks and the liquid beer is stored in a beer well.	165 tons of mash per hour	Wet scrubber. The owner or operator shall route the exhaust gases from the wet scrubber to the regenerative thermal oxidizer associated with Unit #6, except as allowed under the terms of this permit.
	Distillation process. The distillation process distills the liquid beer from the fermentation process. The distillation process consists of the beer stripper, rectifier, side stripper, molecular sieve, and evaporator.	34,026 gallons of beer per hour	
#6	Dryer system – Two ICM dried distiller grains and solubles dryers operated in parallel and a ring dryer operated in series with the two ICM dryers. The two ICM dryers include an ICM multi-cyclone to collect product. The ring dryer includes a Barr-Rosin multi-cyclone to collect product. All three dryers are fired with natural gas.	30 tons of dried distiller grains and solubles per hour.  The two ICM dryers rated at 55 million Btus per hour per dryer.  The ring dryer rated at 60 million Btus per hour.	Seven chambered regenerative thermal oxidizer
	Seven centrifuges used to separate the thin stillage and solids fractions of the wet distiller grain.	Five at 25 tons per hour and two at 50 tons per hour.	
	Exhaust gases from Unit #4 and #26.	See applicable unit	
	Seven chambered regenerative thermal oxidizer fired with natural gas	42 million Btus per hour	
#7	Dried distiller grains and solubles receiver system.	30 tons per hour	MAC baghouse
#8	Dried distiller grains and solubles silo loading process.	27 tons per hour	MAC baghouse
#9	Industrial cooling tower #1 – 3 cell towers	18,000 gallons per minute	Not applicable
#10	Boiler #1 – 2001 Johnston steam boiler, Model #PFTS2000-3G150S, fired with natural gas and diesel.	81 million Btus per hour heat input.	Low NO <sub>x</sub> burner
#11	Boiler #2 – 2001 Johnston steam boiler, Model #PFTS2000-3G150S, fired with natural gas and diesel.	81 million Btus per hour heat input.	Low NO <sub>x</sub> burner
#15	Tank #1 – 2001 aboveground ethanol storage tank.	180,000 gallons	Internal floating roof
#16	Tank #2 – 2001 aboveground ethanol storage tank.	180,000 gallons	Internal floating roof
#17	Tank #3 – 2001 aboveground denatured	1,000,000 gallons	Internal floating

<b>Unit</b>	<b>Description</b>	<b>Maximum Operating Rate</b>	<b>Control Device</b>
	ethanol storage tank.		roof
<b>#18</b>	Tank #4 – 2001 aboveground denatured ethanol storage tank.	1,000,000 gallons	Internal floating roof
<b>#19</b>	Tank #5 – 2001 aboveground denaturant (gasoline) storage tank.	65,000 gallons	Internal floating roof
<b>#20</b>	Submerged truck loading rack	39,000 gallons of denatured ethanol per hour.	Air-assisted flare. The owner or operator shall route the exhaust gases from the truck loading rack to the flare, except as allowed under the terms of this permit.
	Air-assisted flare	6.4 million Btus per hour heat input	
<b>#21</b>	Rail car loading rack	150,000 gallons of denatured ethanol per hour.	The owner or operator shall route the exhaust gases from the rail car loading rack to the flare associated with Unit #20, except as allowed under the terms of this permit.
<b>#22</b>	Hammer mill #1	22 tons per hour	Baghouse
<b>#23</b>	Hammer mill #2	22 tons per hour	Baghouse
<b>#24</b>	Hammer mill #3	22 tons per hour	Baghouse
<b>#25</b>	Hammer mill #4	22 tons per hour	Baghouse
<b>#26</b>	Four fermenters.	Fermenters - 165 tons of mash per hour.	Wet scrubber. The owner or operator shall route the exhaust gases from the wet scrubber to the regenerative thermal oxidizer associated with Unit #6, except as allowed under the terms of this permit.
	Distillation system consisting of beer stripper, rectifier, side stripper, two molecular sieves, and evaporators.	Distillation equals 74,490 gallons of beer per hour.	
<b>#27</b>	Hammer mill #5	22 tons per hour	Baghouse
<b>#28</b>	Hammer mill #6	22 tons per hour	Baghouse
<b>#29</b>	Fluid bed cooler for the dried distiller	30 tons of dried distiller	Baghouse. The

<b>Unit</b>	<b>Description</b>	<b>Maximum Operating Rate</b>	<b>Control Device</b>
	grains and solubles.	grains and solubles per hour	owner or operator shall route the exhaust gases from the baghouse to the ring dryer associated with Unit #6, except as allowed under the terms of this permit.
<b>#30</b>	Dried distiller grains and solubles silo.	3,000 ton capacity. Loading rate of 27 tons per hour.	Baghouse
<b>#31</b>	Industrial cooling tower #2 – 3 cell towers	18,000 gallons per minute	Not applicable

## **1.2 Proposed Revisions**

Northern Lights Ethanol's proposes boiler operational changes. Northern Lights Ethanol is proposing the following revision:

1. Remove hourly limitations related to boiler operations while firing with natural gas.

## **2.0 New Source Performance Standards**

DENR reviewed the New Source Performance Standards listed in 40 CFR Part 60 to determine if any of the federal New Source Performance Standards are applicable to the proposed revisions. The following may be applicable:

### **2.2 Standards Applicable to Boilers**

There are three New Source Performance Standards for fossil fuel-fired steam generators. The three standards are applicable to the following steam generators:

1. 40 CFR Part 60, Subpart D: applicable to a steam generator with a maximum operating rate of 250 million Btus per hour or more and commenced construction after August 17, 1971;
2. 40 CFR Part 60, Subpart Db: applicable to a steam generator with a maximum operating rate of 100 million Btus per hour or more and commenced construction after June 19, 1984; and
3. 40 CFR Part 60, Subpart Dc: applicable to a steam generator with a minimum design heat input capacity equal to or greater than 10 million Btus per hour but less than or equal to 100 million Btus per hour and commenced construction after June 9, 1989.

Both boilers (Unit #10 and #11) were constructed after 1989 and have a maximum heat input greater than 10 million Btus per hour but less than 100 million Btus per hour. 40 CFR 60, Subpart D and Db are not applicable but Dc is applicable. Subpart Dc does not have any emission limits or requirements for boilers fired with natural gas; but does have requirements for boilers fired with diesel. Therefore, the Title V air quality operating permit will specify only

natural gas and distillate oil may be used to fire the boilers and permit conditions specific to the new source performance standard requirements for burning distillate oil. In addition, Northern Lights Ethanol will have to meet the applicable general requirements in 40 CFR Part 60, Subpart A.

Northern Lights Ethanol has already demonstrated compliance with the initial fuel oil sulfur performance tests, initial visibility test, and submitted the initial startup notification. The proposed revisions to the operational limits do not change the applicability status for this subpart. In addition, the applicable conditions in the permit associated with this subpart do not need to be revised due to the proposed revisions.

### **2.3 Other Applicable New Source Performance Standards**

DENR reviewed the other New Source Performance Standards and determined there are no other standards applicable to Northern Lights Ethanol.

## **3.0 New Source Review**

In accordance with ARSD 74:36:10:01, the new source review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. This facility is located near Big Stone City, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, Northern Lights Ethanol is not subject to new source review.

## **4.0 Prevention of Significant Deterioration**

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated air pollutant. The following is a list of regulated air pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM10);
3. Particulate with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO<sub>2</sub>);
5. Nitrogen oxides (NO<sub>x</sub>);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds;
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases.

The Environmental Protection Agency (EPA) recently published and implemented a final rule that no longer lists ethanol plants as a chemical manufacturing plant. Therefore, Northern Lights Ethanol is not classified as a chemical manufacturing plant or one of the 28 listed source categories for PSD regulations and the major source threshold is 250 tons per year, except for greenhouse gases.

According to the Clean Air Act, once a pollutant is regulated under any part of the Act, (as was the case with greenhouse gas emissions after the motor vehicle regulations were finalized in March 2010) major new sources or major modifications are subject to the PSD program and Title V air quality operating permit program. Under the Clean Air Act, PSD and Title V air quality operating permits are required for all sources that emit a regulated air pollutant above 100 or 250 tons per year, depending on the source. This threshold, if applied to greenhouse gases, would greatly increase the number of facilities requiring a PSD review or Title V air quality operating permit. Based on administrative necessity, EPA increased these thresholds through the “Tailoring Rule.”

On May 13, 2010, EPA issued the final version of the “Tailoring Rule” for greenhouse gas emissions. The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
3. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (2) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

#### **4.1 Current Emission and Operational Limits**

The current permit issued in February 2012 contains enforceable permit conditions to ensure actual emissions from the ethanol plant do not exceed the major source threshold under the PSD program. Northern Lights Ethanol’s short term emission limits restrict the facility’s potential emissions to less than 95 tons per year for criteria air pollutants. In addition, the permit contains plant wide emission limits for each criteria air pollutant of 95 tons per 12-month rolling total. Table 4-1 lists Northern Lights Ethanol’s short term emission limits as taken from section 8.0 of the current permit.

**Table 4-1 – Current Short Term Emission Limits**

Unit	Description	Control Device	PM10 (lbs/hr)	SO2 (lbs/hr)	NOx (lbs/hr)	VOCs (lbs/hr)	CO (lbs/hr)
#1	Grain receiving	Baghouse	1.0				
#2	Grain cleaning	Baghouse	0.1				
#4	Fermentation #1	Wet scrubber				10.1	
#6	Dried distiller grains and solubles dryer	Thermal oxidizer	10.0	4.2	14.0	10.0	15.0
#7	Dried distiller grains and solubles receiver	Baghouse	1.2				
#8	Dried distiller grains and solubles silo	Baghouse	0.1				
#10	Boiler #1 (natural gas)	Not applicable	0.3	0.1	3.6	0.3	3.2
	Boiler #1 (diesel)		0.8	42.2	8.9	0.8	6.5
#11	Boiler #2 (natural gas)	Not applicable	0.3	0.1	3.6	0.3	3.2
	Boiler #2 (diesel)		0.8	42.2	8.9	0.8	6.5
#22	Hammer mill	Baghouse	0.5				
#23	Hammer mill	Baghouse	0.5				
#24	Hammer mill	Baghouse	0.5				
#25	Hammer mill	Baghouse	0.5				
#26	Fermentation #2	Wet scrubber				15.2	
#27	Hammer mill	Baghouse	0.5				
#28	Hammer mill	Baghouse	0.5				
#29	Fluid bed cooler	Baghouse	1.5			7.0	
#30	Dried distiller grains and solubles loading	Baghouse	0.1				

In addition to the short term and long term limits, Northern Lights Ethanol accepted operational limits that restrict the operation of certain units. Table 4-2 provides a summary of the existing operational limits derived from Chapter 8.0 of the current permit.

**Table 4-2 – Current Operational Limits**

Unit	Description	Operational Limit
#4/#26	Fermentation #1 and #2	Bypass the regenerative thermal oxidizer associated with Unit #6 for up to 500 hours per unit per 12-month rolling period.
#10/#11	Boiler #1 and #2	Combined operational limit of less than or equal to 3,600 hours per 12-month rolling period while burning diesel.
		Combined operational limit of less than or equal to 8,000 hours per 12-month rolling period while burning natural gas if diesel was burned during the 12-month period.
		Combined operational limit of less than or equal to 15,200 hours per 12-month rolling period while burning natural gas if natural gas is the only fuel burned during the 12-month period.
#20	Ethanol truck load out	Load out limit less than or equal to 50,000,000 gallons of denatured ethanol per 12-month rolling period.

Unit	Description	Operational Limit
#20/#21	Flare	Truck or railcar load out limited to 1,000,000 gallons per 12-month rolling period when the flare has malfunctioned or is not in operation.
	Plant wide	Ethanol production limited to 88 million gallons of undenatured ethanol per 12-month rolling period.
		Grain process limited to 899,360 tons of grain per 12-month rolling period.
		Dried distiller grain and solubles production limited to 296,789 tons per 12-month rolling period.
		Truck load out limited to less than or equal to 148,395 tons of dried distiller grain and solubles per 12-month rolling period.

## 4.2 Proposed Revisions to the Emission and Operational Limits

Northern Lights Ethanol also proposed changes to the boiler operational limits which are displayed in Table 4-3.

**Table 4-3 – Proposed Revisions to Operational Limits**

Unit	Description	Operational Limit
#10/#11	Boiler #1 and #2	Maintain the combined operational limit of less than or equal to 3,600 hours per 12-month rolling period while burning diesel.
		Delete the combined operational limit of less than or equal to 8,000 hours per 12-month rolling period while burning natural gas if diesel was burned during the 12-month period.
		Delete the combined operational limit of less than or equal to 15,200 hours per 12-month rolling period while burning natural gas if natural gas is the only fuel burned during the 12-month period.

## 4.4 Potential Controlled Emission

Table 4-4 summarizes the potential emissions from the permitted units under the short term and operational limits listed in Northern Lights Ethanol's Title V air quality permit issued February 18, 2012, and updated with proposed revisions by Northern Lights Ethanol. Potential emissions for each applicable pollutant are calculated from the maximum design capacity listed in the application.

**Table 4-4 –Potential Controlled Emissions (tons per year)**

Unit	Description	PM10	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO
#1	Grain receiving	4.4				
#2	Grain cleaning	0.4				
#4	Fermentation #1				2.5	
#6	Dried distiller grain and solubles dryers	43.8	18.4	61.3	43.8	65.7

Unit	Description	PM10	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO
#7	Dried distiller grain and solubles receiver	5.3				
#8	Dried distiller grain and solubles silo	0.4				
#10/#11	Boiler #1 and #2 (distillate oil & natural gas) <sup>1</sup>	3.53	76.66	41.08	3.53	33.97
#22	Hammer mill #1	2.2				
#23	Hammer mill #2	2.2				
#24	Hammer mill #3	2.2				
#25	Hammer mill #4	2.2				
#26	Fermentation #2				3.8	
#27	Hammer mill #5	2.2				
#28	Hammer mill #6	2.2				
#29	Fluid bed cooler	6.6			30.7	
#30	Dried distiller grain and solubles loading	0.4				
#15-#19	Tank #1 through #5				1.4	
Fugitive	Equipment leaks				5.5	
	Load out without flare				5.6	
<b>Facility Emissions</b>		<b>78</b>	<b>95</b>	<b>102</b>	<b>96</b>	<b>100</b>

<sup>1</sup> – The emissions are based on the worst case scenario of fuel consumption, which are 3,600 combined hours of distillate oil and 13,920 combined hours of natural gas as proposed by Northern Lights Ethanol's application

#### 4.5 Potential to Emit for Greenhouse Gases

Northern Lights Ethanol is considered an existing non-PSD source due to the operational limits in their existing Title V air quality operating permit. The proposed revisions to the operational limits do not change this scenario. Based on the statement of basis associated with the Title V air quality permit issued February 18, 2012, Northern Lights Ethanol has the potential to emit more than 100,000 tons per year of carbon dioxide equivalent emissions.

Therefore, the next step is to determine if Northern Lights Ethanol's proposed revisions have the potential to emit 75,000 tons per year of carbon dioxide equivalent emissions or more and is a major modification under the PSD program. There are six regulated greenhouse gases which are listed below:

1. Carbon dioxide;
2. Nitrous oxide;
3. Methane;
4. Hydrofluorocarbons;
5. Perfluorocarbons; and
6. Sulfur hexafluoride.

A major modification under PSD is defined as any physical change or change in the method of operation of a major source resulting in a significant emissions increase of a regulated pollutant

and a significant net emissions increase of that pollutant. A significant emissions increase under PSD is defined as a net emissions increase or the potential emissions increase that equals or exceeds the pollutant specific thresholds in 40 Code of Federal Regulation (CFR) § 52.21(b)(23)(i) and/or, major modifications constructed within 10 kilometers of a Class I area, that impact a Class I area equal to or greater than 1 microgram per cubic meter ( $\mu\text{g}/\text{m}^3$ ) (24-hour average). The Deer Creek Station is not located within 10 kilometers of a Class I area.

The PSD regulations establish the following procedure for determining if a proposed project is subject to a PSD review:

1. Determine the potential increase in emissions from the proposed project and compare it to the significant emission rates in 40 CFR §52.21(b)(23). If the potential increase (does not include or consider any proposed decreases resulting from the proposed project) is greater than the significant emission rate, proceed; if not, the source is not subject to a PSD review.
2. Determine the beginning and ending dates of the contemporaneous period as it relates to the proposed modification.
3. Determine which emissions units at the source experienced (or will experience, including any proposed decreases resulting from the proposed project) a creditable increase or decrease in emissions during the contemporaneous period.
4. Determine which emissions changes are creditable.
5. Determine, on a pollutant-by-pollutant basis, the amount of each contemporaneous and creditable emissions increase and decrease.
6. Sum all contemporaneous and creditable increases and decreases with the increase from the proposed modification to determine if a significant net emissions increase will occur.

The significant emission increase would be associated with the additional combined 2,320 hours of boiler operation while burning natural gas. The greenhouse gas emission factors for firing the units with natural gas are from AP-42, Table 1.4-2, July 1998 and are listed below:

1. Carbon dioxide = 120,000 pounds per million cubic feet;
2. Nitrous oxide 2.2 pounds per million cubic feet;
3. Methane = 2.3 pounds per million cubic feet.

Equation 4-1, the appropriate emission factors and operating rates were used to determine the potential significant increase of greenhouse gas emissions.

***Equation 4-1– Projected increase of natural gas***

$$\text{Projected} \left( \frac{\text{million cubic feet}}{\text{year}} \right) = \frac{81 \left( \frac{\text{million Btus}}{\text{hour}} \right) \times 2,320 \left( \frac{\text{hours}}{\text{year}} \right)}{1,000 \left( \frac{\text{million Btus}}{\text{million cubic feet}} \right)}$$

In the case of the greenhouse gases, the result of Equation 4-2 needs to be multiplied by 1, 310, and 21 for carbon dioxide, nitrous oxide, and methane, respectively, to convert the results to carbon dioxide equivalent. The potential significant increase for the greenhouse gases are summarized in Table 4-5.

#### ***Equation 4-2 – Potential emissions increase***

$$\text{Projected } \left( \frac{\text{tons}}{\text{year}} \right) = \frac{187.9 \left( \frac{\text{million cubic feet}}{\text{year}} \right) \times \text{emission factor} \left( \frac{\text{pounds}}{\text{million cubic feet}} \right)}{2,000 \left( \frac{\text{pounds}}{\text{ton}} \right)}$$

***Table 4-5 –Greenhouse Gas Potential Significant Increase Emissions (tons per year)***

<b>Description</b>	<b>Capacity (MMBtu/hr)</b>	<b>Carbon Dioxide</b>	<b>Nitrous Oxide</b>	<b>Methane</b>	<b>Carbon Dioxide Equivalent</b>
<b>#10/11 - Boilers</b>	81 each	11,274	0.2	0.2	11,340

Based on Tables 4-4 and 4-5, the proposed revisions to the operational limit do not change Northern Lights Ethanol status as a minor source for criteria pollutants and is not considered a major modification under the PSD program for greenhouse gases. Therefore, Northern Lights Ethanol is not subject to a PSD review.

Northern Lights Ethanol’s request to revise the operational limits increase the potential emissions greater than 100 tons per year but are still less than the 250 ton per year threshold. The existing permit limits the emissions to 95 tons per 12-month rolling period. DENR will revise those limits to 238 tons per 12-month rolling period. This revision still allows Northern Lights Ethanol to forgo a PSD review of the existing operations.

## **5.0 National Emission Standards for Hazardous Air Pollutants**

DENR reviewed 40 CFR Part 61 to determine the applicability to this facility’s boilers and determined none to be not applicable.

## **6.0 Maximum Achievable Control Technology Standards**

### **6.1 Potential HAP Emissions**

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

The statement of basis associated with the Title V air quality operating permit issued in February 18, 2012 identifies the facility as an area source of hazardous air pollutants. The proposed revisions to the operational limit do not change this status.

### **6.4 Industrial, Commercial, and Institutional Boilers and Process Heaters**

40 CFR Part 63, Subpart DDDDD establishes national emission and operating limits for hazardous air pollutants emitted from industrial, commercial, and institutional boilers and process heaters located at a major source of hazardous air pollutant emissions. Because of

emission and operational limits, Northern Lights Ethanol is considered an area source of hazardous air pollutants and not subject to this subpart.

## **6.5 Area Source for Industrial, Commercial and Institutional Boilers**

On March 21, 2011, EPA finalized the MACT standard under 40 CFR Part 63, Subpart JJJJJ. This rule applies to all new or existing industrial, commercial, and institutional boilers located at an area source of hazardous air pollutants. An existing boiler is defined as a boiler where construction or reconstruction occurred prior to June 4, 2010.

Northern Lights Ethanol operates two boilers that were both constructed prior to June 4, 2010. Both boilers are rated at 81 million Btus per hour and are fired with natural gas and diesel. The potential hazardous air pollutant emissions from Northern Lights Ethanol classify it as an area source of hazardous air pollutants. Northern Lights Ethanol is subject to this subpart because it burns diesel in the two boilers.

The proposed revisions to the operational limits do not change the applicability status for this subpart. In addition, the applicable conditions in the permit associated with this subpart do not need to be revised due to the proposed revisions.

## **6.6 Other MACT Standards**

DENR reviewed the other Maximum Achievable Control Technology Standards and determined there are no other standards applicable to the proposed revisions.

## **7.0 State Requirements**

### **7.1 State Particulate, Sulfur Dioxide, and Visible Emission Limits**

The proposed revisions to the operational limits do not change the applicability status for South Dakota's particulate matter, sulfur dioxide and visibility limits. In addition, the applicable conditions in the permit associated with the state's limits do not need to be revised due to the proposed revisions.

### **7.4 Compliance Assurance Monitoring**

Compliance assurance monitoring is applicable to any unit at major sources applying for a Title V air quality operating permit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

Boiler #1 and Boiler #2 are not subject to compliance assurance monitoring because they do not use a control device to meet the established limits.

## **7.5 Periodic Monitoring**

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to the Title V air quality operating permit program. The proposed revisions to the operational limits are for the two.

Periodic monitoring of the operational limit shall be based on recordkeeping and reporting requirements.

## **7.6 Air Fees**

Sources subject to the Title V air quality operating permit program are subject to an annual air quality fee. The fee consists of an administrative fee and a per ton fee based on the actual tons per year of pollutant emitted. The pollutants charged for are particulate matter, sulfur dioxides, nitrogen oxides, volatile organic compounds, and hazardous air pollutants. The actual emissions are calculated by DENR based on operational information provided by the source.

## **8.0 Recommendation**

Based on the information submitted in the air quality permit application, DENR recommends conditional approval to modify Northern Lights Ethanol's Title V air quality permit. Any questions pertaining to this permit recommendation should be directed to Ashley Brakke, Engineer I, at (605) 773 3151.

## **APPENDIX A**

### **PERMIT MODIFICATION**

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The following changes to the existing permit represent changes that meet the definition of a permit modification. Additions to the existing permit are represented in blue, bold, and underline and deletions are represented in red with overstrikes. In the case where permit conditions are deleted or added between permit conditions, the permit conditions will be renumbered appropriately when the permit is issued.

## **1.0 Standard Conditions**

### **1.1 Operation of source**

In accordance with Administrative Rules of South Dakota (ARSD) 74:36:05:16.01(8), the owner or operator shall operate the units, controls, and processes as described in Table 1-1 in accordance with the statements, representations, and supporting data contained in the complete permit application submitted March 9, 2011, and September 11, 2012, unless modified by the conditions of this permit. Except as otherwise provided herein, the control equipment shall be operated at all times in accordance with the manufacturer's specification and in a manner that achieves compliance with the conditions of this permit. The application consists of the application forms, supporting data, and supplementary correspondence. If the owner or operator becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in an application, such information shall be promptly submitted.

## **8.0 PSD and Case-by-Case MACT Exemption**

### **8.1 Plant wide particulate matter limit (PM10)**

In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air greater than or equal to ~~95~~ **238** tons of particulate matter less than or equal to 10 microns in diameter (PM10) per 12-month rolling period. The short term limits in Table 8-1 are established to ensure the long term limit to ~~95~~ **238** tons per 12-month rolling period is not exceeded.

***Table 8-1 – PM10 Short Term Limits***

<b>Unit</b>	<b>Description</b>	<b>Short Term Limit</b>
<b>#1</b>	Grain receiving	1.0 pounds per hour
<b>#2</b>	Grain cleaning	0.1 pounds per hour
<b>#6</b>	Regenerative thermal oxidizer	10.0 pounds per hour
<b>#7</b>	Dried distiller grains and solubles receiver	1.2 pounds per hour
<b>#8</b>	Dried distiller grain and solubles silo loading	0.1 pounds per hour
<b>#10</b>	Boiler #1 (natural gas)	0.3 pounds per hour
	Boiler #1 (distillate oil)	0.8 pounds per hour
<b>#11</b>	Boiler #2 (natural gas)	0.3 pounds per hour
	Boiler #2 (distillate oil)	0.8 pounds per hour
<b>#22</b>	Hammer mill #1	0.5 pounds per hour
<b>#23</b>	Hammer mill #2	0.5 pounds per hour
<b>#24</b>	Hammer mill #3	0.5 pounds per hour
<b>#25</b>	Hammer mill #4	0.5 pounds per hour
<b>#27</b>	Hammer mill #5	0.5 pounds per hour
<b>#28</b>	Hammer mill #6	0.5 pounds per hour
<b>#29</b>	Fluid bed cooler	1.5 pounds per hour

Unit	Description	Short Term Limit
#30	Dried distiller grains and solubles silo	0.1 pounds per hour

The PM10 emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods. Compliance with the short term limit will be based on the stack testing requirements in chapter 9.0.

### **8.2 Plant wide particulate limits (PM2.5)**

In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air greater than or equal to ~~95~~ **238** tons of particulate matter less than or equal to 2.5 microns in diameter (PM2.5) per 12-month rolling period. The short term limits in Table 8-2 are established to ensure the long term limit to ~~95~~ **238** tons per 12-month rolling period is not exceeded.

**Table 8-2 – PM2.5 Short Term Limits**

Unit	Description	Short Term Limit
#1	Grain receiving	1.0 pounds per hour
#2	Grain cleaning	0.1 pounds per hour
#6	Regenerative thermal oxidizer	10.0 pounds per hour
#7	Dried distiller grains and solubles receiver	1.2 pounds per hour
#8	Dried distiller grain and solubles silo loading	0.1 pounds per hour
#10	Boiler #1 (natural gas)	0.3 pounds per hour
	Boiler #1 (distillate oil)	0.8 pounds per hour
#11	Boiler #2 (natural gas)	0.3 pounds per hour
	Boiler #2 (distillate oil)	0.8 pounds per hour
#22	Hammer mill #1	0.5 pounds per hour
#23	Hammer mill #2	0.5 pounds per hour
#24	Hammer mill #3	0.5 pounds per hour
#25	Hammer mill #4	0.5 pounds per hour
#27	Hammer mill #5	0.5 pounds per hour
#28	Hammer mill #6	0.5 pounds per hour
#29	Fluid bed cooler	1.5 pounds per hour
#30	Dried distiller grains and solubles silo	0.1 pounds per hour

The PM2.5 emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods. Compliance with the short term limit will be based on the stack testing requirements in chapter 9.0.

### **8.3 Plant wide sulfur dioxide limit**

In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air greater than or equal to ~~95~~ **238** tons of sulfur dioxide per 12-month rolling period. The short term limits in Table 8-3 are established to ensure the long term limit to ~~95~~ **238** tons per 12-month rolling period is not exceeded.

**Table 8-3 – Sulfur Dioxide Short Term Limits**

Unit	Description	Short Term Limit
#6	Regenerative thermal oxidizer	4.2 pounds per hour
#10	Boiler #1 (natural gas)	0.1 pounds per hour
	Boiler #1 (distillate oil)	42.2 pounds per hour
#11	Boiler #2 (natural gas)	0.1 pounds per hour
	Boiler #2 (distillate oil)	42.2 pounds per hour

The sulfur dioxide emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods. Compliance with the short term limit will be based on the stack testing requirements in chapter 9.0.

#### **8.4 Plant wide nitrogen oxide limits**

In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air greater than or equal to ~~95~~ 238 tons of nitrogen oxide per 12-month rolling period. The short term limits in Table 8-4 are established to ensure the long term limit of ~~95~~ 238 tons per 12-month rolling period is not exceeded.

**Table 8-4 – Nitrogen Oxide Short Term Limits**

<b>Unit</b>	<b>Description</b>	<b>Short Term Limit</b>
<b>#6</b>	Regenerative thermal oxidizer	14.0 pounds per hour
<b>#10</b>	Boiler #1 (natural gas)	3.6 pounds per hour
	Boiler #1 (distillate oil)	8.9 pounds per hour
<b>#11</b>	Boiler #2 (natural gas)	3.6 pounds per hour
	Boiler #2 (distillate oil)	8.9 pounds per hour

The nitrogen oxide emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods. Compliance with the short term limit will be based on the stack testing requirements in chapter 9.0.

#### **8.5 Plant wide carbon monoxide limits**

In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not emit into the ambient air greater than or equal to ~~95~~ 238 tons of carbon monoxide per 12-month rolling period. The short term limits in Table 8-5 are established to ensure the long term limit of ~~95~~ 238 tons per 12-month rolling period is not exceeded.

**Table 8-5 – Carbon Monoxide Short Term Limits**

<b>Unit</b>	<b>Description</b>	<b>Short Term Limit</b>
<b>#6</b>	Regenerative thermal oxidizer	15.0 pounds per hour
<b>#10</b>	Boiler #1 (natural gas)	3.2 pounds per hour
	Boiler #1 (distillate oil)	6.5 pounds per hour
<b>#11</b>	Boiler #2 (natural gas)	3.2 pounds per hour
	Boiler #2 (distillate oil)	6.5 pounds per hour

The carbon monoxide emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods. Compliance with the short term limit will be based on the stack testing requirements in chapter 9.0.

#### **8.12 Unit #10 and #11 – Hourly limit**

In accordance with ARSD 74:36:05:16.01(8), the owner or operator shall not operate Unit #10 and #11 for greater than a combined 3,600 hours per 12-month rolling period while firing with diesel.